VAA-Weekly-Progress

10/02-10/15

Context

- Trained RTMPose to match OpenMMPose Stats
- Working on algorithm to extract annotations for only antelopes and other subsets for future training
- Updated hip and shoulder keypoints to two keypoints each for increased accuracy

Agenda

- Further updates to keypoint definition
- Understanding the json format of annotations to help with clarifying how to label occlusions
- Brainstorming for the abstract

Goals

- Finalize keypoint definitions and adjust occlusion handling - Medha and Claire
- Document AP10K JSON format and make it easier for people to do individual work on species similarity - Parth
- Script to parse AP10k annotations by species or groups of species - Josh
- Work on identifying similar species using annotations - Armaan and Aryan, everyone else with free time
- Finish setting up Tensorboard for experiment tracking -Shaan
- Solve issue for exporting annotations out of Label Studio - Shaan
- Brainstorm and draftf Abstract for expo - Everyone (deadline 17th October)

Keypoint Definitions - Redesigned

- Used more high quality images (Roan Antelope)
- Simplified our method of occlusion handling
- Redefined root of tail
- Question: In the context of the root of tail (for a specific pose), should we be labeling the point consistently with other points (and have it be occluded) or label it at the visible end of the back (but not be consistent with the definition)?
- New Definition and Old Definition

AP10K JSON format

- Written documentation of the JSON data files in AP10K dataset that we will use to train the RTMPose models
- Clarifies scheme needed for our data as well (specifically for visible vs non visible parts for keypoints)
- Key finding: For keypoints the scheme is list([x, y, v]) for each keypoint type.
  - v=0 not labeled, v=1: labeled but not visible, and v=2: labeled and visible
  - Unfortunately v=2 is used for every labeled keypoint

AP10k Test Set Labels

```
Keypoint Visibility Status Counts:
Status 0: 18096
Status 1: 0
Status 2: 26002
```

Documentation of AP10K JSON Format:
https://docs.google.com/document/d/1IYtKTpvS9_zEnk1fIRkd3QTxB-bGhruuK6Y4xPpCNrM/edit?usp=sharing

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AP10k Annotation Parsing Script

- Fixed Python Script from previous week so now proper subsets of the AP10k image data(folder of images) and annotations(new annotation file) can be created of species or groups of species.

```
# Prepare the output JSON with valid structure
output_data = {
    "info" : info,
    "licenses" : licenses,
    "images": filtered_images,
    "annotations": filtered_annotations,
    "categories": filtered_categories,
}
```

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Next Steps

- Evaluate new labeling scheme by measuring average precision per keypoint from everyone's labels on a sample of images to identify any weaknesses in scheme

- Conduct statistical analysis on labels and develop our own method of quantifying species similarity

- Set up our first formalized experiment- Get enough images labeled to form a train, val, test split (ideally >300)

Rough Plan for Abstract

- Train RTMPose on our data from default weights
- Train on our data from pre-trained AP10k weights
- Train on AP10k antelopes + similar species by taxonomy save checkpoint, and continue training with our data
- Train on AP10k antelopes + similar species by our own definitions save checkpoint, and continue training with our data
- Evaluate all trained models on our test set

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Personal Progress

Shaan

- Annotated 100 images with labels (Set 3)
- Figured out issue with importing and exporting data while retaining filenames, set up input and output folders to sync label studio project to
- Parsed AP10k labels to see how visibility tags were assigned
- Finally sorted out issues with Cisco VPN so now able to access DeadCat without being on campus

Medha

- Annotated 100 images with labels (Set 4)
- Made finalized keypoint definitions
  - Replaced all images with high quality images from 4 different angles
  - Simplified Occlusion Handling
  - Met with group to discuss method of labeling some trickier points

Parth

- Annotated 100 images with labels (Set 6)
- Documented COCO JSON format of AP 10k dataset
  - Identified root keys in the JSON and important identifiers within each section of the root keys
- Met with group to discuss finalizing keypoint definition
- Discussed research abstract with group

Aryan

- Annotated 100 images with labels
- Met with group and discussed how to handle occlusions on specific trickier areas

Armaan

- Annotated 100 images with labels (set 5)
- Finalized occlusion handling
  - Discussed method of handling tricker occlusions with team
- Discussed next steps and research abstracts with group